Configuration Management

BTeV Document 3522

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1 Overview

Configuration management provides the means to version and tag the components in the experiment in order to identify and track the configuration at all times throughout the life of the experiment. It is a sound engineering practice

Linked to configuration management is change control, i.e., the process of determining which changes are accepted and implemented by the experiment. Details of the change control process can be found in the BTeV Project Management System Description, BTeV Document #3301.

The BTeV collaboration is using several configuration management tools depending on the various types element to be managed. The various element types and associated tools are described below:

2 Configuration Management Element Types

2.1 Documentation

BTeV maintains a central documentation database to store and track documents of all types including, but not limited to, requirements, design, and specifications documents. The WBS files themselves are managed in this database. The documentation database maintains the history of older versions and notes associated with the changes made for each version.

Special documents, such as an L2 requirements document, may require signoff by various BTeV management, Lab management, or others. These documents are flagged with an associated signoff sheet in the document database. The database software manages the electronic signoff of these documents.

The documentation database was written and is maintained by the collaboration. It has been so successful at Fermilab, that it has been cloned for the Beams and Computing Divisions to track the individual Division's documents.

Information regarding the database design including document signoff can be found in BTeV Document #140. The link to the BTeV database can be found at

http://www-btev.fnal.gov/cgi-bin/DocDB/DocumentDatabase

and help is obtained by following the Help link.

As the BTeV documentation database is an integral part of the overall configuration management strategy for the experiment, a more detail is provided in the following subsections describing some of its features.

2.1.1 Save/access all versions of a particular document

When searching for a document, links to the most recent version of the document are shown. Additionally links to all older versions of the document are listed. See Figure 1 for an example of a document with revisions.

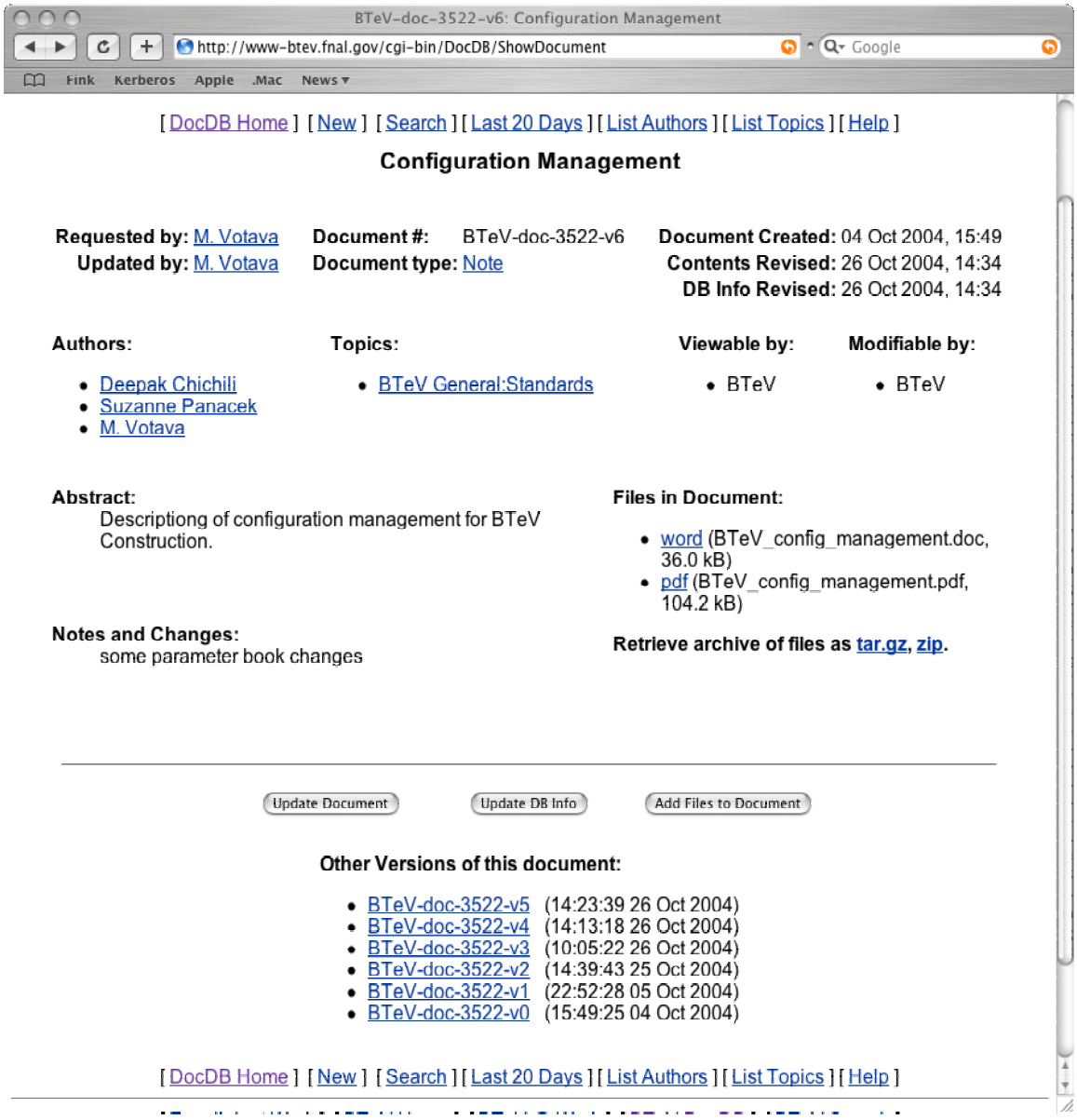

Figure 1. Example Entry in the Document Database

2.1.2 Associate unique text based revision notes with each revision.

Each document revision can optionally have text associated with it that is used to describe why this revision was made, what changes are included, etc. See Figure 2 for an example of how to enter notes and refer back to Figure 1 for how the notes field is displayed.

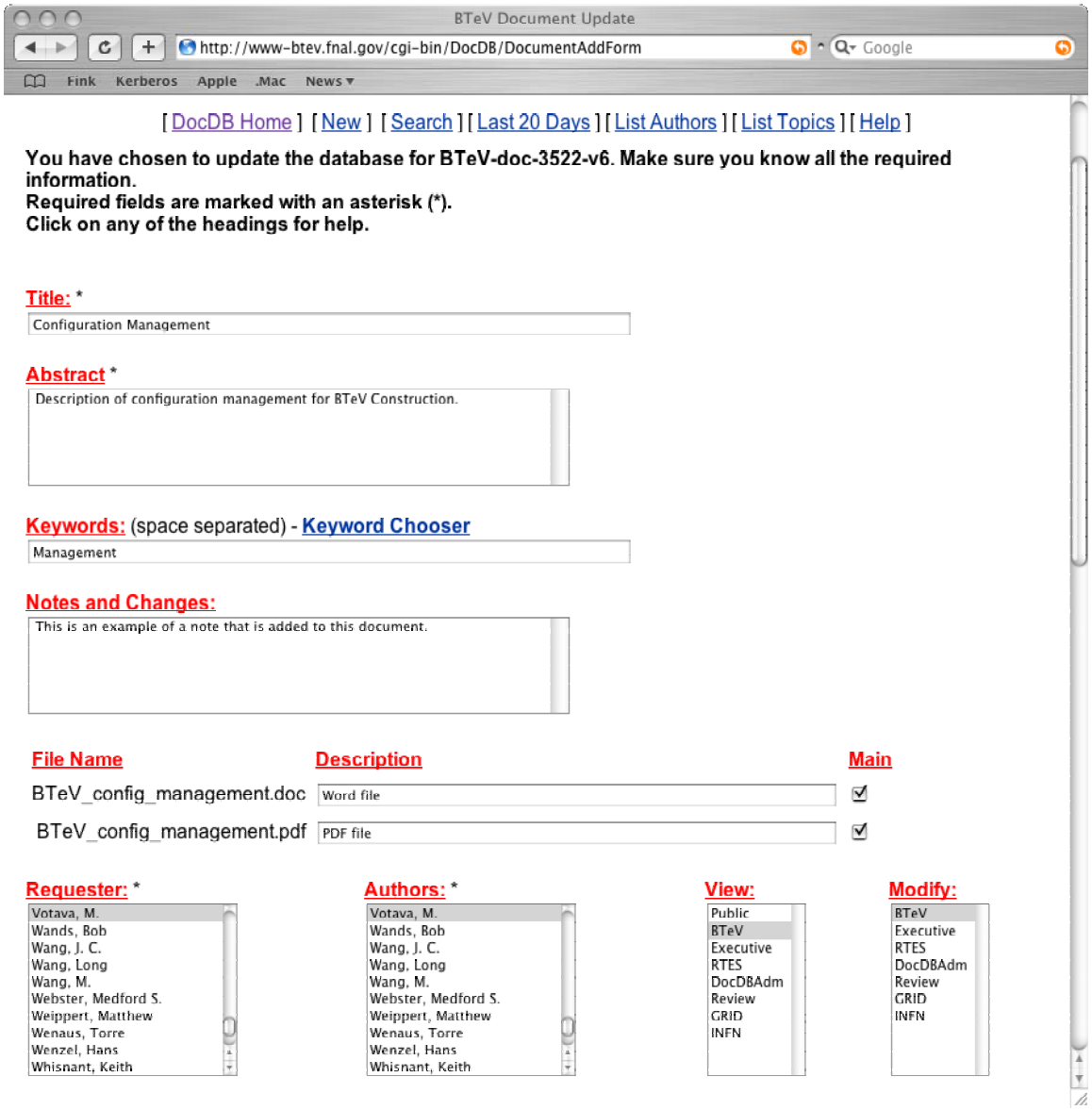

Figure 2. Example of Notes Fields and Access Rights

2.1.3 Associate people who can view and modify the document (these lists may/may not have overlapping members).

Two separate access lists are maintained for each document: one for a list of allowed viewers (ie, read only) and one for a list of allowed modifiers (ie, read/write). See Figure 2 for an example of these lists.

2.1.4 Maintain and track a list of electronic signatures for documents requiring signoff.

In addition to tracking document changes, several BTeV documents require signoff by relevant individuals both internal and external to the collaboration. The document database supports this by requiring signatories to register a login id (with password) that is then used to electronically signoff on relevant documents. Signatures are associated with a particular version of the document, so if changes are made and the database

updated, new signatures are required. See Figure 3 for an example document with appropriate signoff.

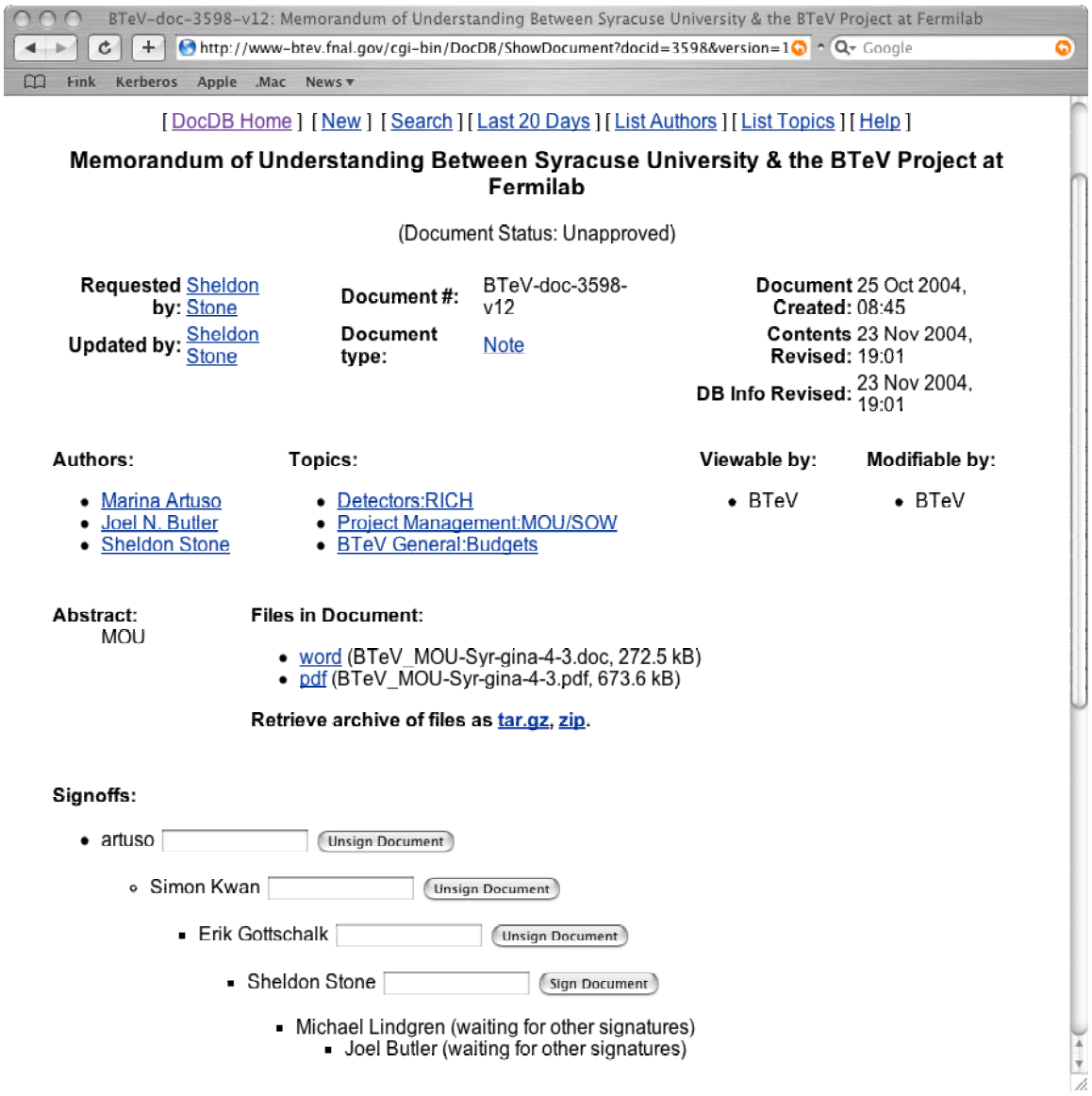

Figure 3. Example of Document Signoff

2.2 Engineering Drawings

The fallback for all engineering drawings is the BTeV documentation databases. Certain activities have an different methodology for tracking documents. These are described below.

2.2.1 C-0 Outfitting

Configuration management of engineering documents needed for the C-0 outfitting project (WBS 3.0) can be found in BTeV document #3532.

2.2.2 CAD Data and Drawings

The I-Deas CAD software will be used to create 3-D models and 2-D drawings of all parts created for the BTeV project. I-Deas uses a Team Data Manager (TDM) to store parts, assemblies and drawings, and to provide configuration control for these records. For the first time at Fermilab, a TDM that spans Division boundaries has been set up. This TDM is accessible to all BTeV I-Deas users across the Laboratory, allowing parts, assemblies, and drawings to be shared by all project members.

Macros that run within I-Deas have been written that will allow the designer to input information about the part being modeled and its associated drawing. These attributes will be searchable, and get saved along with the drawing. The macros will ensure consistency by offering pull-down lists for many attribute values, and by providing a common title block, font, and color scheme.

A unique number will be issued for each drawing created within the BTeV TDM. The number banks assigned to the BTeV project will be shared across Divisions. A particular drawing number may be shared by the part or assembly used to create the drawing, but all drawing numbers will be unique. Some large drawings require multiple sheets. These multiple sheet drawings each share the same drawing number with a different sheet number, and this option will continue to be supported.

Newly created drawings will be checked and approved by the appropriate engineer before being released. An Engineering Release (ER) form will have to be filled out by the drafter and signed by the engineer as part of the drawing release process. Once the ER is completed, the drawing will be given Released Status within TDM and its configuration will be locked. The macros will also create a PDF file of the released drawing, and store it in an area of the server that is web-accessible and searchable.

Drawings to be revised will follow a similar procedure, and will be checked and approved by the appropriate engineer before being processed. An Engineering Change Order (ECO) will have to be filled out by the drafter and signed by the engineer. The revised drawing will retain the same drawing number as the original drawing but with a different revision number. Once the revised drawing is given Released Status within the TDM, its configuration will be locked, and a web-accessible PDF file will be produced.

All drawings produced in TD will be plotted full size to create an original paper drawing. This original will contain the actual checked and approved signatures. All original paper drawings will be stored in a print room drawer on the third floor of ICB. No released original paper drawing will be allowed to be taken from the print room. Once the ER or ECO process is complete, copies of the original drawings will be used by for reference, procurement, and inspection purposes.

Electronically, all I-Deas CAD data produced for the BTeV project will be stored on a server located in Technical Division. This server is maintained by the TD Computer Information System group. All 3-D and 2-D data on this server will be completely backed up every night.

2.3 Software

Software developed by the collaboration is maintained in a central BTeV CVS repository. CVS is the dominant open-source network-transparent software version control system. It supports versioning and tagging of individual files as well as releases. Documentation regarding the BTeV repository can be found at:

http://www-btev.fnal.gov/atwork/computing/tools/cvs.shtml

Additionally, the offline infrastructure has currently adopted a build and management layer on top of CVS called SRT (Software Release Tools). SRT provides a framework to link CVS modules together. Additional documentation regarding SRT can be found at:

http://www-btev.fnal.gov/atwork/computing/offline/environment.shtml

2.4 Detector Parameters and Geometry

The nominal parameters for the detector are managed by the parameter book (PBook http://www-btev.fnal.gov/PBook/ParBook.jsp). The parameters are grouped into detectors or modules, which can be versioned and tagged. In addition, each individual parameter has a change history. Along with the parameters, a definition of each paramter and a dictionary are available. All documentation, data (xml), and software for the PBook is in CVS. The next step for the PBook is to design an official sign off and approval procedure and to put the parameters and track the changes in a relational data base.

We are currently experimenting with GDML (Geometry Description Meta Language) to describe the detector geometry for use by BTeV's software.GDML is a specialization of XML, developed at CERN to describe geometries. We are using it with Geant4 based simulations to understand if it meets our needs and to refine our requirements. The GDML detector description files are in CVS.